

## Electrical Code Issues And Answers.

### ● Carnival Electrical Inspection Fees

WAC 296-46-910(i) specifies the fees required to obtain electrical inspections for carnivals. This portion of the Inspection fee section is divided into four sections.

First field inspection of the year when part of a carnival: The fee for rides and generators is \$16 each. The fee for remote distribution equipment, concessions, or gaming shows is \$5 each. A minimum fee for first of the year inspections is \$84.25.

Subsequent inspections when part of a carnival: The fee for the first ten (10) rides, concessions, generators, remote distribution equipment, or gaming shows is a minimum of \$84.25. Each additional unit is \$5 each.

First field inspection of the year when not part of a carnival: The fee for single concessions or rides is \$67.

Subsequent inspections when not part of a carnival: The fee for single concessions or rides is \$44.25.

If the inspection involves both types of inspection, first of the year and subsequent, the minimum fees for both must be assessed. First of the year field inspections and subsequent inspections are substantially different in nature and are considered separate inspections.

### ● Grounding for Two or More Buildings or Structures

NEC 250-32(b)(1) requires a separate equipment grounding conductor to be installed between buildings. The equipment grounding conductor must be run with the supply conductors and be connected to the structure disconnecting means and grounded to the grounding electrode system required by NEC 250-32(a).

NEC 250-32(b)(2) says that when an equipment grounding conductor is not installed, three specific conditions must be met. *"Where (1) an equipment grounding conductor is not run with the supply to the building or structure, and (2) there are no continuous metallic paths bonded to the grounding system in both buildings or structures involved, and (3) ground-fault protection of equipment has not been installed on the common ac service, the grounded circuit conductor run with the supply to the building or structure shall be connected to the building or structure disconnecting means and to the grounding electrode(s) and shall be used for grounding or bonding of equipment, structures, or frames required to be grounded or bonded."*

Code-making Panel Five concludes there is no "...sound technical basis for knowingly permitting neutral current to return to the source on parallel paths..." Bonded metallic paths that could create parallel paths with the supply conductors may include: water lines, gas lines, shielded coaxial cable, telephone wiring, or other power wiring.

### ● "Capable of Being Locked"?

The National Electrical Code uses the term "capable of being locked" in many places, but does not provide a concise definition of intent. "Capable of being locked" is used when guaranteed disconnection of equipment and/or circuits is required for the protection of personnel. General Safety and Health Standards, WAC 296-24-11003(3) (lock out and tag out), says *"...An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it."*

Circuit breaker accessories that do not have the capability of affixing a lock do not satisfy the requirements of "capable of being locked." The accessory device or other method satisfying the requirement of "capable of being locked" must be installed at the time the panel or disconnecting device is inspected.

### ● What Happens If I Lose My Approved Plan Review Drawings?

WAC 296-46-140 states that the approved drawings must be on the job site for use by the installer and electrical inspector. After approval, the submitted drawing set is stamped by electrical plan review and returned to the submitter. It is normally the only copy of the approved drawings. The Department does not keep a copy of approved drawings. If the approved drawings are lost, the inspection process may be slowed or in some cases stopped. If the

approved drawings cannot be found, they must be re-submitted to plan review and another complete review must take place. A new, complete plan review fee would be required for the second review. Recently, this has been a common problem. The Department encourages customers to carefully protect and track approved plans.

### ● On-Site Sewage Disposal Systems Installations with Manual Run Switches

Electricians have installed sewage disposal controllers incorporating manual “run” switches which may allow an operator to place the manual switch into the “run” position and pump the sewage tank dry. WAC 296-46-5002 requires “the submergence of the pumping motor shall be guaranteed by the design of the pump or by redundant off floats.” The department may revise this rule but until such revisions are made, the requirements for guaranteed submergence of the sewage pumping motor must not be defeated by manual “run” or other circuiting methods.

### ● Disconnection Provisions for Maintenance & Service of Gasoline Dispensing Equipment

New language in 1999 NEC 514-6 addresses the disconnection of all external voltage sources for servicing and maintenance of dispensing equipment. Dispensing equipment includes all equipment that dispenses gasoline, volatile flammable liquids, or liquified flammable gases.

The installation of a multi-pole switching device could be allowed between the branch circuit panel and multiple dispensers provided all circuit conductors (grounded and ungrounded) to those dispensers are disconnected. The new provisions for maintenance and service of dispensing equipment do not specify that each dispensing device be separately provided with a disconnecting means. The 1998 NFPA Report on Proposals does not address the issue of separate disconnecting means.

An emergency disconnecting means is required in NEC 514-5. WAC 296-46-514 allows a multi-circuit electrically held contactor to be used as the gasoline pump disconnecting means. Department practice has allowed a multi-circuit disconnecting switch to also serve as the emergency disconnecting means. The emergency disconnecting means required in NEC 514-5 could serve as the service and maintenance disconnecting means providing all external voltage sources (grounded and ungrounded circuit conductors) are disconnected. The installer must remain aware that if separate disconnecting devices are provided for each dispenser, interconnecting control wiring may introduce the possibility of control circuit feedback.

### ● Wireway Conduit Entry

The 1999 NEC 362-6 now provides clarification of the requirements for multiple conduit and cable entries into wireways containing the same insulated conductors, size No. 4 or larger. New material in NEC 362-6 says that *“...where insulated conductors No. 4 or larger enter a wireway through a raceway or cable, the distance between those raceway and cable entries shall not be less than six times the trade diameter of the larger raceway or cable connector.”* The distance should be measured between the closest points of the entries. This requirement closely approximates the requirements for pull boxes in NEC 370-28 for angle pulls. NEC 362-6, for wireways, establishes a minimum distance separation of entry points. NEC 370-28, for pull boxes, establishes minimum box dimensions and a minimum distance separation of entry points.

### ● NEC 700 Emergency Transfer, Pickup, and Shedding Requirements

The department has had problems recently with two requirements in NEC 700. A revised section, NEC 700-6, states that transfer equipment (switches) serving NEC 700 Emergency Loads (egress lighting, fire alarms, etc.) may not serve any other loads, including NEC 701 Legally Required Standby, or NEC 702 Optional Standby System.

*Does this mean that separate transfer equipment (switch) is required to supply NEC 700 Emergency Loads?* Yes. Transfer equipment supplying Emergency Loads may supply only those Emergency Loads.

Another article, NEC 700-5(b), allows the emergency generator or other alternate power source to pickup three types of loads, Emergency Systems (NEC 700), Legally Required Standby (NEC 701), or Optional Standby Systems (NEC 702). If the alternate power source supplies loads other than those for Emergency Systems, the system must provide automatic selective load pickup and load shedding “as needed” for all loads. The order of priority for load pickup and shedding is NEC 700, NEC 701, then NEC 702 loads. The NEC 700 Emergency Loads must be kept on line at the cost of all others.

The term “as needed” allows the use of non-automatic load pickup and shedding in certain situations. Clarification of the requirements should be made on a case-by-case basis with the electrical inspector or plan reviewer. The requirement for automatic load pickup or shedding is dependent on equipment sizing and load requirements.